

AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A method for identifying the orientation in a three dimensional free space of a preselected locating device comprising a plurality of recognizable indicia disposed thereon, from a projected image of the locating device in a view plane of a video camera, comprising steps of:

detecting the locating device from the projected image by recognizing relative positions of indicia merely disposed on the locating device's image within the view plane and relative spacings between the indicia;

calculating corresponding projected image coordinate positions of the indicia on the locating device's position in free space based upon the relative positions and the relative spacings of the indicia and known camera geometric dimensions; and

converting the projected image coordinate positions into the real world location of the locating device in free space.

2. (previously presented) The method of claim 1 wherein the indicia on the locating device's image are three preselected co-linear points.

3. (previously presented) The method of claim 1 wherein the locating device comprises an alignment indicator.

4. (previously presented) The method as defined in claim 1 wherein the converting comprises identifying a location and pointing direction of the locating device in the free space.

5. (previously presented) The method as defined in claim 1 wherein the preselected locating device comprises a wand for communicating a pointing direction in an augmented-reality display system, the detecting comprising detecting pixel location on the view plane of beads on the wand corresponding to the three preselected co-linear points.

6. (original) The method as defined in claim 5 wherein the beads comprise a predetermined color and the detecting includes detecting the pixel locations representing a property of the color.

7. (original) The method defined in claim 6 wherein the color property is at least hue.

8. (original) The method as defined in claim 5 wherein the detecting includes finding a center pixel location of each of the beads.

9. (previously presented) The method as defined in claim 1 wherein the known camera geometric dimensions comprise a given distance between a view point and a view plane of the camera, and the calculating comprises converting the relative positions of the points based on the given distance and the known spacing of the points, to an object distance in the free space between the predetermined locating device and the view plane.

10. (original) A method for determining a location of a wand in a preselected free space from a video image of the wand, wherein the wand comprises three equidistantly-spaced, co-linear beads, comprising steps of:

capturing the video image of the wand on a view plane of a video camera system wherein the image is represented by a frame memory including relative positions of the beads;

determining centers of the beads on the view plane and relative spacings between the centers; and,

calculating coordinate positions of the beads in the free space based upon the relative spacings and known camera system geometries of generating the video image.

11. (original) The method as claimed in claim 10 wherein the wand includes an alignment indicator and the calculating includes determining a pointing direction of the wand from the alignment indicator and the coordinate positions of the beads.

12. (original) The method as claimed in claim 11 wherein the beads comprise a distinctive indicia from a background setting of the video image and the determining includes recognizing the distinctive indicia.

13. (original) The method as claimed in claim 10 wherein the calculating comprises unprojecting the video image and verifying that the coordinate positions are reasonable representations of the wand in the free space.

14. (currently amended) A system for identifying a position and pointing direction of a preselected locating device in a three dimensional free space from an image thereof captured in a video camera wherein the locating device includes a plurality of equidistantly-spaced, co-linear indicia disposed thereon, and the camera includes a known system geometry, the system comprising:

a frame memory comprising a pixel representation of the image; and
a processor for detecting relative positions of the indicia and relative spacings between the indicia in a view plane from the pixel representation, and for computing corresponding coordinate positions of the indicia of the locating device in the free space merely from the relative positions and the relative spacings of the indicia and the known system geometry.

15. (previously presented) The system in claim 14 wherein the locating device further includes an indicator for indicating a pointing direction of the locating device.

16. (previously presented) The system as defined in claim 14 wherein the processor further includes means for verifying that the coordinate positions are consistent with a plausible free space position of the locating device.